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Design analysis of monitoring and inventory management at Public Elementary School Kalikajar Wetan Paiton

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ABSTRACT

This study aims to analyze and design an effective monitoring and inventory management system at Public Elementary School Kalikajar Wetan, Paiton. A well-structured inventory management system is crucial to ensure efficient asset management, reduce the risk of loss, and improve operational effectiveness. The research methods employed include direct observation, in-depth interviews with school staff, and a literature review on inventory management systems. The analysis of the existing system revealed several shortcomings in the manual recording method, such as data inaccuracies, potential duplication of information, and delays in inventory reporting. As a solution, this study proposes the design of a digital system featuring automated recording, real-time data updates, and organized data access. This system design is expected to enhance efficiency, accuracy, and transparency in the school's inventory management. The findings indicate that implementing the proposed system supports faster decision-making, minimizes errors, and provides convenience in monitoring overall assets. Thus, the design holds significant potential as a model for inventory management in other educational institutions.

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Introduction

Inventory management has an important contribution in an educational institution to achieve the goals of the teaching and learning process well (Rani, 2024). The availability of inventory is a benchmark for the quality of educational institutions. For this reason, inventory management in educational institutions requires optimal attention (Madamidola, 2024).

As an educational institution, Public Elementary School Kalikajar Wetan Paiton Probolinggo has many inventory needs such as books, sports equipment, computers and so on. Good inventory management will help ensure the availability of the goods needed and prevent losses due to loss or damage to goods (Agus Wantoro, 2022). However, in the inventory management of goods carried out at Public Elementary School Kalikajar Wetan, there are currently still several obstacles that are faced, including the difficulty of monitoring the stock of goods in inventory management which is currently carried out still using manual records so that it requires a lot of time and energy. This can make stock management less effective and efficient (Nurfahman & Nurhayati, 2021).

In the inventory management of goods carried out at Public Elementary School Kalikajar Wetan, it is currently difficult to track the history of the goods, such as the schedule for the goods to be returned, who uses the goods and when the goods must be replaced (Aprilia Ira, 2022). Also the limitations in conducting inventory analysis in managing the inventory of goods carried out, currently it is difficult to analyze the stock of available goods, such as how many items are available, what items are often purchased and when the goods must be replaced. (Rani, 2024)

Therefore, an inventory monitoring and management application is needed that can help Public Elementary School Kalikajar Wetan Paiton Probolinggo in managing inventory more effectively and efficiently. This application is expected to help in monitoring stock in real-time, track the history of goods, and analyze the available stock of goods.

Method

In this study, a combination of qualitative and quantitative methods is used. Part of the qualitative method includes important aspects such as formulating research questions and collecting data through observation, interviews, and literature review (Winardi, 2024). Meanwhile, quantitative methods are used to conduct tests that aim to draw conclusions. As for system development, the Rapid Application Development (RAD) model is used as the main framework (Wisastra, 2022).

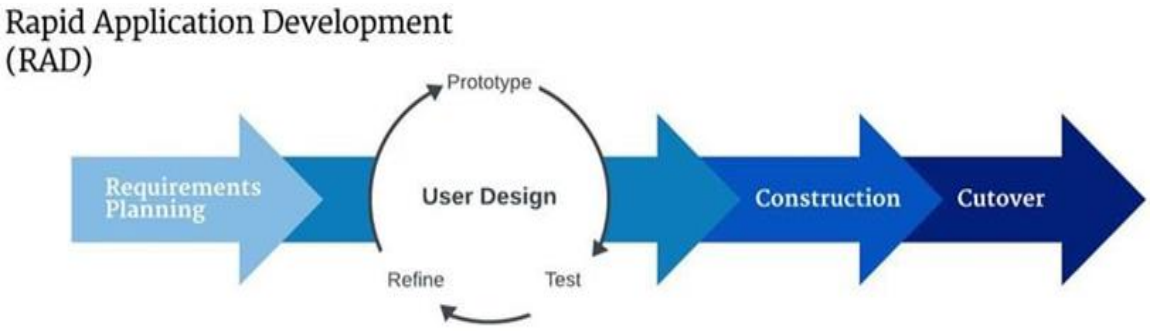

Figure 1. Model Rapid Application Development (RAD)

1. Needs plan aims to analyze needs in creating systems and solving problems with inventory management. By conducting an analysis, it will be known in detail about the needs in the research. To solve the needs, it can be done by observing the study site and conducting interviews to find out detailed information about the problem.
2. System design is one of the activities to compile and design in the form of an overview of the completion of the system to be built. To build and design a system can be done using flowcharts, DFDs, Tiered Charts and Entity Reconciliation Diagrams. The following is a discussion in the system design stages.
3. Writing program code is a stage in the completion of the application system, so that in the creation of the system that is prepared can run according to the needs of inventory management at Public Elementary School Kalikajar Wetan. By writing code on the program, it can provide convenience in running the system and the system can function in accordance with the inventory management workflow.
4. Program testing is the last stage of the system that is built, with the aim of clearly knowing the process and workflow on the system. There are two steps to test the program, namely internal testing and external testing which aim to find out the advantages, disadvantages and functions of the system.

This study uses an analysis method for inventory management by applying the RAD method as shown above. To solve the problems discussed and the research framework, there are several processes used in research on inventory management. The following is the research framework.

1. Problem Identification: Problem identification is to find sources of information on the core of existing problems, so that in-depth discussions will be carried out with the aim of solving problems with inventory management. By identification, it can be known in detail about the procedures and

processes in inventory management that are still not conducive to data management.

2. Data Collection: Data collection aims to find out information and the core of problems with inventory management data management. Data collection is an activity to find data in the field, namely at Public Elementary School Kalikajar Wetan which will be used to solve problems and analyze so that an inventory management system can be built.
3. System Design: System design involves the planning arrangements and processes involved in creating a system plan to manage inventory. It is an action that details how the system will function in managing data.
4. Program Testing: Program testing is testing on the system that has been created so that the advantages and disadvantages of system features can be known in detail. In program testing, there are two types, namely internal testing and external testing. After testing, the program will be clearly known about the process and workflow on the system that has a value from several program testers.
5. Conclusion: The conclusion is to conclude the results of the discussion that has been discussed previously related to inventory management, so that the need for functionality in the system will be known. By making conclusions, it covers various needs in solving problems, namely building a system, designing a system and results in managing inventory management data at Public Elementary School Kalikajar Wetan.

Results and Discussions

From the discussion of problems related to inventory of goods at Public Elementary School Kalikajar Wetan, there is the validity of the data on its management so that it is necessary to solve the problem, which at this time makes it difficult for officers to manage inventory data.

1. Analysis of the old system: With the old system, SARPRA officers have difficulty finding the place of existence of goods in the warehouse provided by Public Elementary School Kalikajar Wetan. In addition, the data management is still not conducive so that it is very unprofitable in the management of goods at Public Elementary School Kalikajar Wetan flowchart as shown in the figure 2.
2. Analysis of the new system: The new system that is built can make it easier to control inventory management at Public Elementary School Kalikajar Wetan which contains features that show the process in data management, one of which is inventory data of goods, data on types of goods, data on damage and warehouses as a place to store goods at Public Elementary School Kalikajar Wetan. With this new system, TU officers and school operators can control all data related to school inventory management which is able to efficiently and effectively manage school data. This system is provided to make reports on goods, types of goods and warehouses at Public Elementary School Kalikajar Wetan so that institutions can find out in detail and inventory at Public Elementary School Kalikajar Wetan.

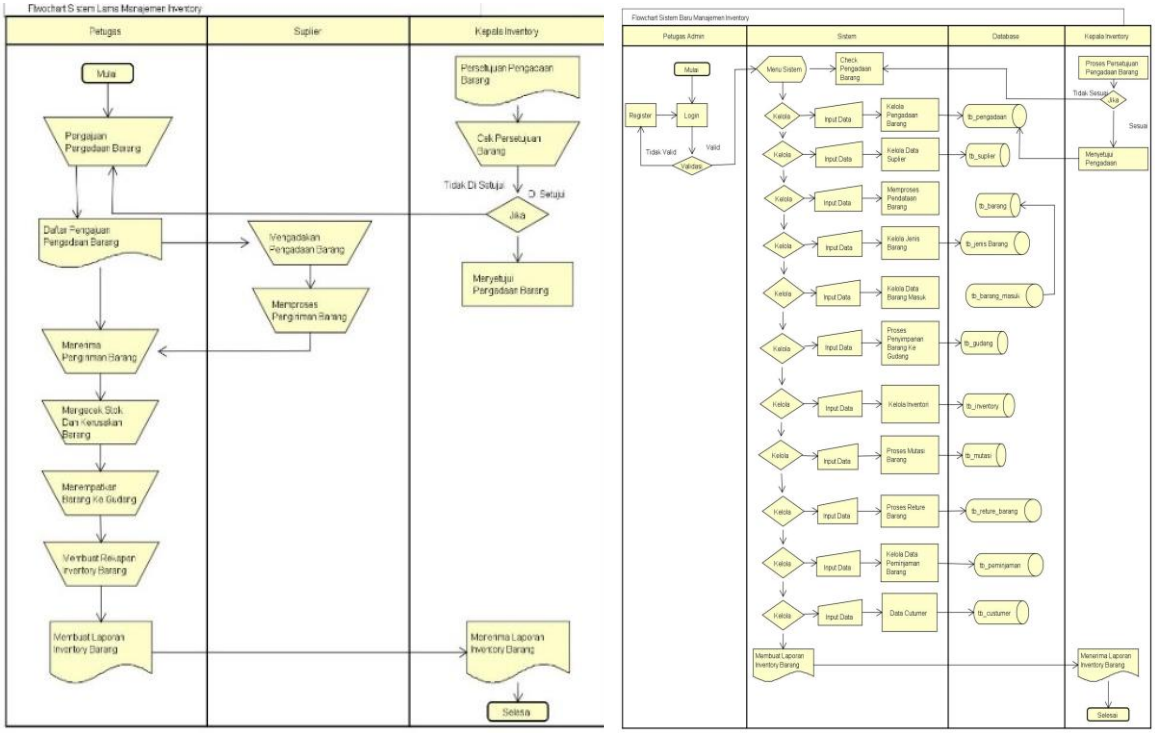

Figure 2. Flowchart Analysis of the old and new system

A context diagram is a diagram that is referred to as level 0 as a determination of procedures in the workflow of the built system. The context diagram itself contains an entity and a store as a marker that the entity is interconnected with other entities. By being described with a context digram, it can complete the procedure of the workflow stages in the monitoring and management system at Public Elementary School Kalikajar Wetan. Here's an overview of the context diagram. Here's an overview of the context diagram as the following picture.

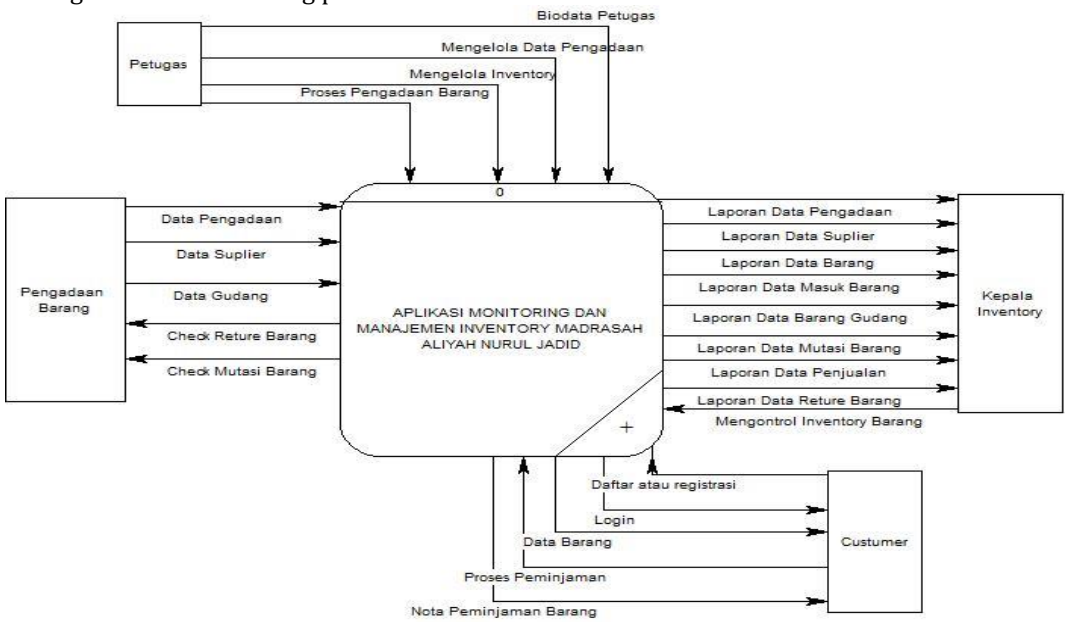

Figure 3. Application context diagram

In order to be able to clarify in detail the workflow on the built system. By describing using a tiered chart, it can be known in detail the process and relationship of each existing entity.

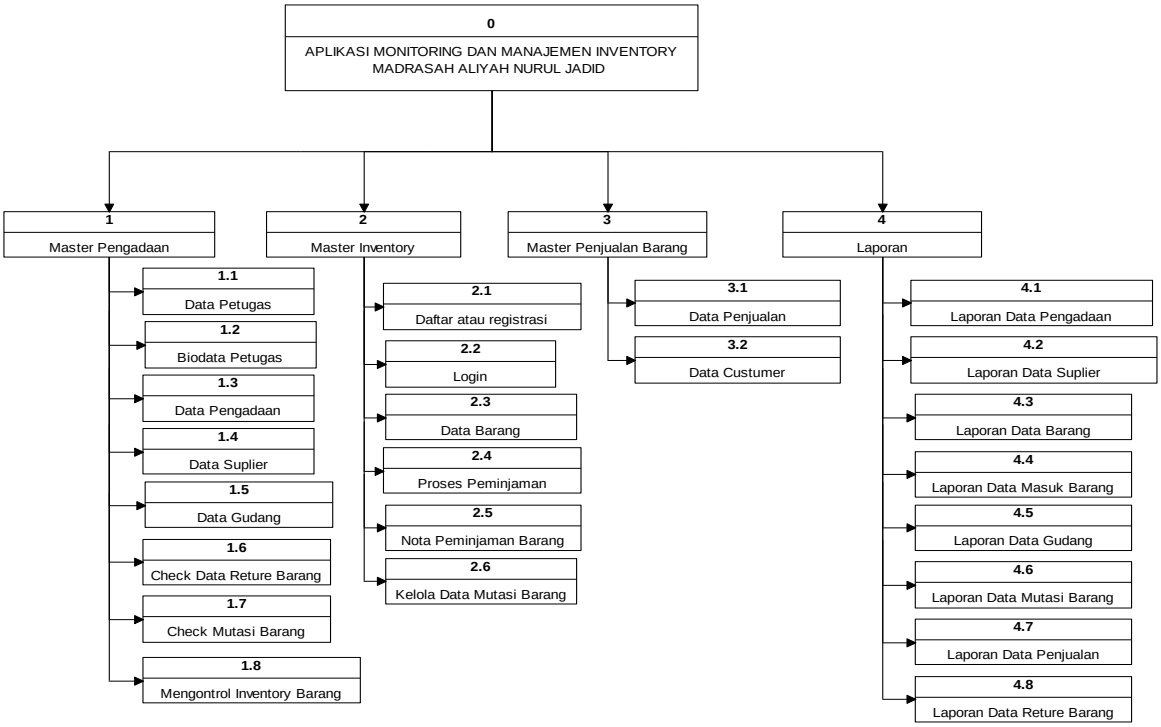

Figure 4. Application tiered charts

Entity Relationship Diagrams (ERDs) can more clearly illustrate how data flows and interacts in a system, as well as how existing functions describe the processes and sequences of work in the system Below is an example of an ERD that provides a visual overview of the structure and relationships of data in a system.

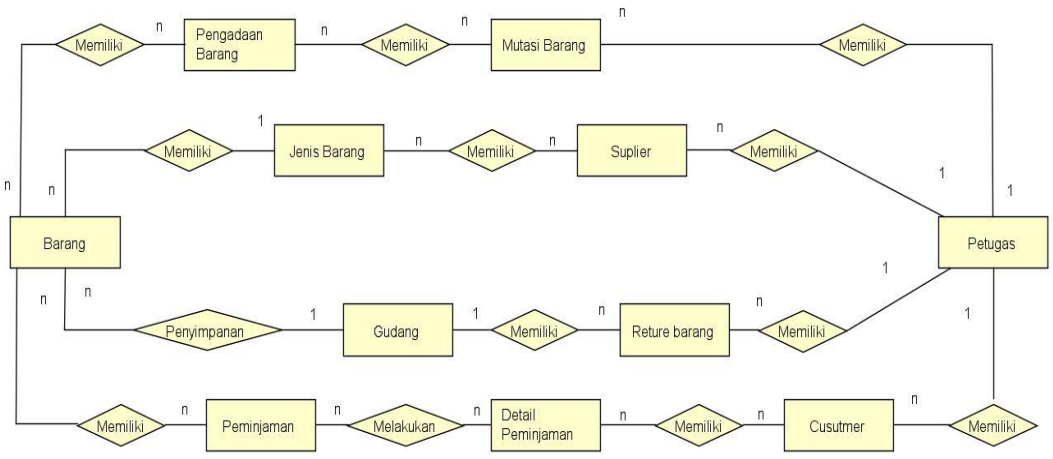

Figure 5. Entity Relationship Diagram Application

UI Interface Design

In the implementation of the system design that has been agreed upon, the next stage is realized in the correct programming language. The system is built based on the analysis and design that has been carried out. The following is an overview of the initial stage of the inventory management application implementation system of Public Elementary School Kalikajar Wetan.

On this main page there is a display page, users must enter their username and password to verify the data. There are several categories of users who can log in to the system, namely admin inventory officers, procurement officers and customers. The display of the design page in the system can be seen in the image below.

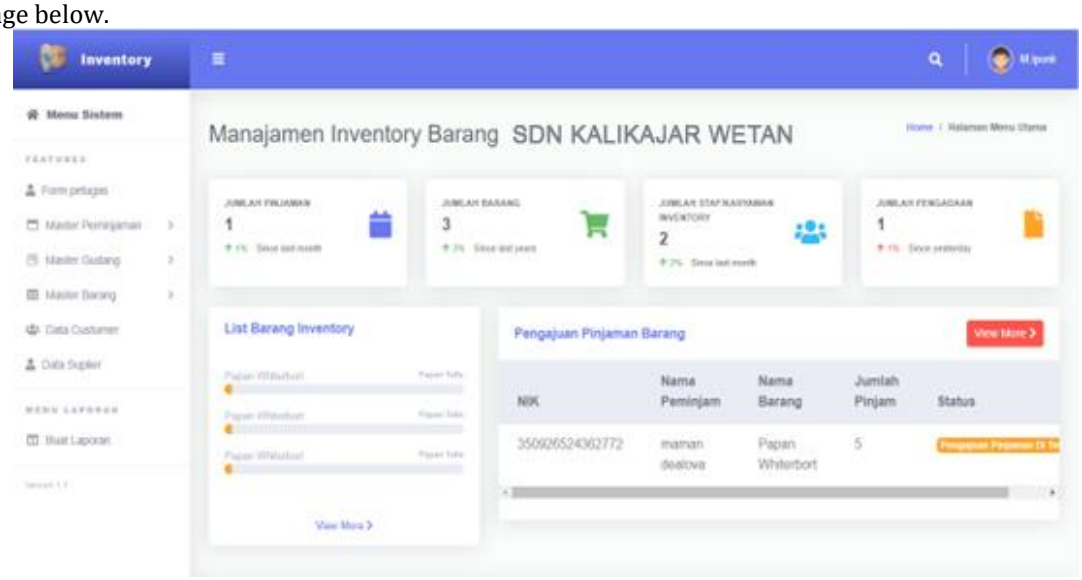

Figure 6. UI Interface Design

Conclusions

Conclusion This study resulted in the analysis and design of a monitoring system and inventory management that can be applied at Public Elementary School Kalikajar Wetan, Paiton. Based on the analysis of the manual system used previously, a number of major weaknesses were found, such as data inaccuracy, duplication of information, and delays in recording and reporting inventory. This hampers the efficiency of school asset management. As a solution, this research designs a digital-based system that is able to automatically record data, update information in real-time, and provide more organized data access. The implementation of this system shows great potential in improving work efficiency, data accuracy, and transparency in inventory management. With the new system in place, schools can monitor assets more effectively, reduce the risk of asset loss or damage, and support faster, data-driven decision-making. The resulting system design also has the flexibility to be applied in other educational institutions with minimal adjustments. This study recommends full system implementation and training for users to ensure optimal adoption. Further development can also be done to add additional features as the school needs in the future. Based on the trials that have been carried out, there are results that respondents consider the application to be of high quality because the scale rating shows a figure of 87.5%

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